ANSWERS

Multiple Choice Questions

1. (c)

2. (c)

3. (d)

$$\text{Number of atoms} = \frac{\text{Mass of substance}}{\text{Molar mass}} \times N_A \times \text{Number of atoms in the molecule}$$

$\therefore$ (a) 18 g of water $= \frac{18}{18} \times N_A \times 3 = 3\,N_A$

(b) 18 g of oxygen $= \frac{18}{32} \times N_A \times 2 = 1.12\,N_A$

(c) 18 g of $CO_2 = \frac{18}{44} \times N_A \times 3 = 1.23\,N_A$

(d) 18 g of $CH_4 = \frac{18}{16} \times N_A \times 5 = 5.60\,N_A$

4. (c)

5. (b)

6. (b)

7. (a)

8. (d)

9. (b)

10. (d)

11. (b)

12. (a)

13. (a)

14. (a)

15. (a)

16. (b)

Short Answer Questions

17. Yes, it is true. In both the phenomena, there is movement of particles from region of higher concentration to that of lower concentration. However, in case of osmosis the movement of solvent is through a semi permeable membrane which is permeable only to water molecules.

18.

(a)	(b)	(c)	(d)
NH_3	CO	HCl	AlF_3
N: H × 3	C:O	H: Cl	Al: F × 3
14: 1× 3	12: 16	1: 35.5	27: 19 × 3
14: 3	3: 4	2:71	9: 19

19. (a) $Al(NO_3)_3$
(b) $Ca_3(PO_4)_2$
(c) $HgCl_2$
(d) $Mg(CH_3COO)_2$

20. Helium atom has 2 electrons in its outermost shell and its duplet is complete. Hence the valency is zero.

21. **Hint**— Exosmosis in intestine causes dehydration

22. On the basis of voluntary muscles – a, c

On the basis of involuntary muscles– b, d

23. **Hint**— Due to aerenchyma present in the swollen petiole.

24. (i) *Helicobactor pylori*
(ii) Marshall and Warren.

25. **Hint**—
(a) No need of storage.
(b) Because they are lignified.
(c) Presence of stone cells (sclerenchyma)
(d) Presence of Collenchyma.

26. Let AB = x

So $t_1 = \frac{x}{30}$ and $t_2 = \frac{x}{20}$

Total Time = $t_1 + t_2 = \frac{5}{60}x$

Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$$= \frac{2x}{\frac{5x}{60}} = 24 \text{ km h}^{-1}$$

27. Acceleration $= \frac{v-u}{t} = \frac{80-0}{8} = 10\,\text{m s}^{-2}$

Force $= m \times a = \frac{50}{1000} \times 10 = 0.5\,\text{N}$

28. Density of the sealed packet $= \frac{m}{V} = \frac{500}{350} = 1.4\,\text{g cm}^{-3}$

As the density of the packet is greater than that of the saturated salt solution, the packet will sink.

Mass of the solution displaced = Volume of the packet × Density of the solution.

= 350 × 1.2 = 420 g.

29. **Hint—** This is practiced to check soil erosion through water currents on the slopes.

30. Fertile soils are rich in organisms that decompose dead organic matter forming humus. Humus gives minerals, absorbs water and makes soil porous.

31. Useful traits of improved crops are

(a) higher yield

(b) improved nutritional quality

(c) resistance to biotic and abiotic stresses

(d) change in maturity

(e) wide range of adaptability

(f) desired agronomic characteristics.

32. (b) → (c) → (a) → (d)

33. Merits of Italian bee variety *Apis mellifera* are—

(a) It stings less.

(b) It has high honey collection capacity.

(c) It stays in given beehive for long periods and breeds very well.

Long Answer Questions

34. **Hint**— (a)Dilute milk solution is a colloid and would show Tyndall effect.

(b) Salt solution is a true solution and would not scatter light.

(c) Detergent solution, sulphur solution.

Or

(a) No.

(b) $\text{Mass\%} = \dfrac{\text{Mass of solute}}{\text{Mass of solute} + \text{Mass of solvent}} \times 100$

Solution made by Ramesh

$$\text{Mass\%} = \frac{10}{10+100}\ 100 = \frac{10}{110} \times 100 = 9.09\%$$

Solution made by Sarika

$$\text{Mass\%} = \frac{10}{100} \times 100 = 10\%$$

35. **Hint—** Due to poor immune system, some children fall ill frequently. Balanced diet and proper nutrition for healthy body is required to have a strong immune system.

Or

For a healthy person it is necessary that

(a) The surrounding environment should be clean. Air and water borne diseases will not spread.

(b) Personal hygiene prevents infectious diseases.

(c) Proper, sufficient nourishment and food is necessary for good immune system of our body.

(d) Immunisation against severe diseases.

36. Definition of power

kW is the unit of power and kWh is the unit of energy.

(a) $\because\ v_1 = v\ ;\ v_2 = 3v$

$$KE_1 = \frac{1}{2} mv^2$$

$$KE_2 = \frac{1}{2} m\,(3v)^2 = \frac{9}{2} mv^2$$

$$KE_1 : KE_2 = \frac{1}{2} mv^2 : \frac{9}{2}\ mv^2 = 1:9$$

(b) $p_1 = mv;\ p_2 = m \times 3v = 3\ mv$

$p_1 : p_2 = mv : 3mv$

$= 1 : 3$

Or

(a) $F = 250 \text{ kg} \times g = 250 \times 10 = 2500 \text{ N}$

$s = 1 \text{ m}$

$W = F.\ s = 2500 \text{ N m} = 2500 \text{ J}$

(b) Zero, as the box does not move at all while holding it.

(c) In order to hold the box men are applying a force which is opposite and equal to the gravitational force acting on the box. While applying the force men make muscular effort. So they get tired.

37. (a) Echo

(b) Time $= \dfrac{\text{Distance}}{\text{Speed}}$ that is, $t = \dfrac{2d}{V}$

or $d = \dfrac{V \times t}{2} = \dfrac{V \times 1}{2 \times 10} = \dfrac{V}{20} \text{ m}$ $\because$ time = 0.1 s

(c) The speed of sound increases with temperature. So on a hotter day speed of sound is more.

Or

$v = v\,\lambda$ (Derivation)

(a) $340 = 256\ \lambda$

$\lambda = 1.33 \text{ m}$

(b) $340 = v\ (0.85)$

$v = 400 \text{ Hz}$

38. The fossil fuels like coal and petroleum contain small amounts of nitrogen and sulphur. When fossil fuels are burnt, it produces oxides of nitrogen and sulphur. These gases cause inhalation problems and in presence of rain forms acid rain. Burning of fossil fuels also increases the amount of suspended particles in air that reduce the visibility.

Or

Hint— The rocks are heated by the sun; they contract during night but not at same rate —resulting in cracks in rocks and ultimately to smaller particles.